

Dr. Dmitry Bedrov, University of Utah

Molecular Modeling of Interfaces in Energy Storage Devices

Abstract: Dramatic improvements in the energy storage devices are badly needed to facilitate the management of constantly growing energy demands by the society and to mitigate its environmental impact. However, the development of new generation of these devices is often hampered by the complexity and convoluted interdependence of variety of electrochemical, physical, and mechanical phenomena occurring electrolyte/electrode interfaces. In this talk, Dr. Bedrov will demonstrate how molecular scale modeling can be used to understand the relationships between interfacial properties and the performance of lithium ion batteries and supercapacitors. Specifically, he will discuss correlations between the details of molecular scale structure at interfaces (i.e., electrode surface topography and nanostructure, chemical structure of ions in electrolyte, etc.) and the performance of electric double layer capacitors (i.e., storage capacitance). For the Li-ion batteries we will discuss the importance of molecular level understanding of mechanisms of ion transport through solid electrolyte interphase (SEI).

Bio: Dr. Dmitry Bedrov received his B.S. in Thermophysics at the Odessa State Academy of Refrigeration in Ukraine in 1995, and Ph.D. in Chemical and Fuels Engineering at the University of Utah in 1999. After that, he served on the research faculty for several years at the University of Utah Materials Science & Engineering Department where in 2012 he became an Associate Professor. In 2012, he received a Humboldt Fellowship for Experienced Researchers that allows him to have strong collaboration with scientist in Germany. He has more than 115 publications in peer reviewed journals.